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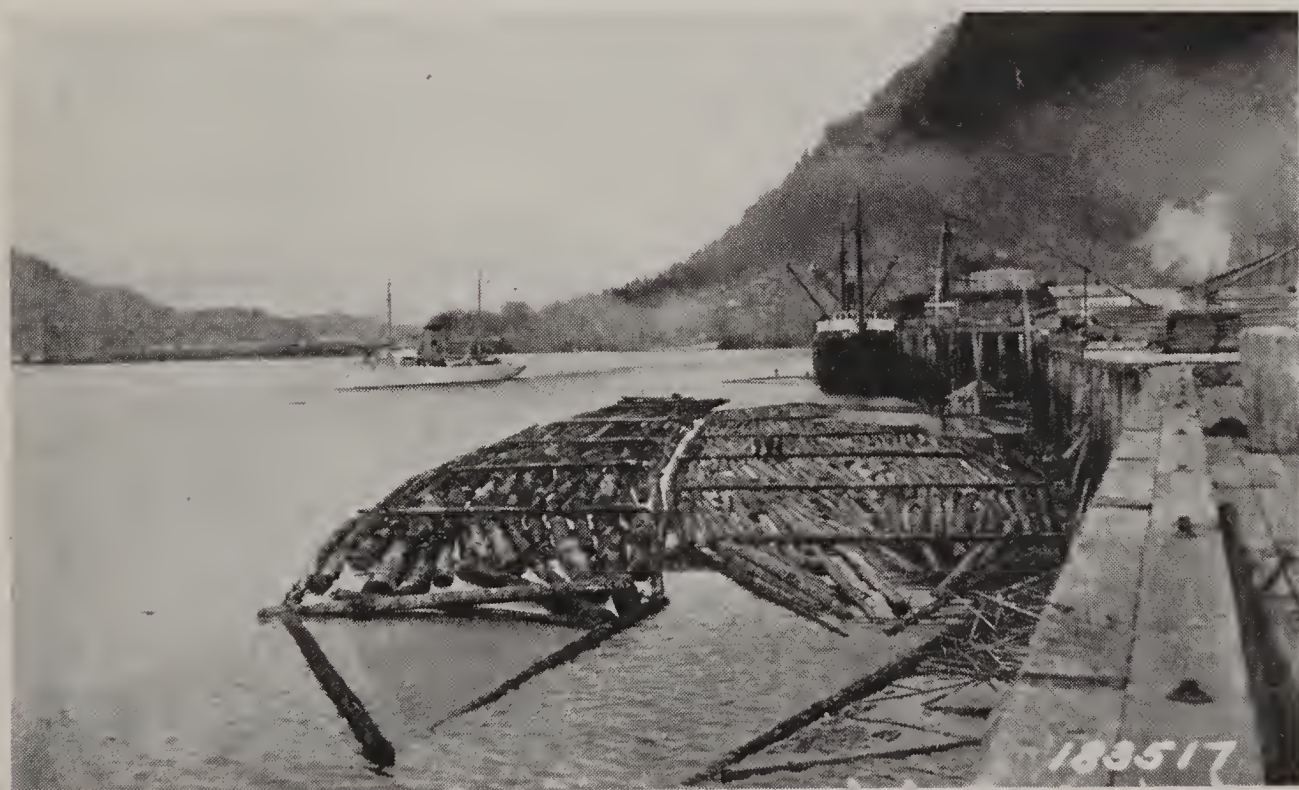
U. S. DEPARTMENT OF AGRICULTURE
✓ FOREST SERVICE
✓ ALASKA REGION

A
OPPORTUNITIES FOR MINOR WOOD PRODUCT
INDUSTRIES IN ALASKA

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Alaska expects a surge of new settlers after the War. If these newcomers are to become permanently established and contribute substantially to the economy of the Territory, present industries will need to be expanded and new industries started. One or a few big industrial units, like pulp and paper manufacturing plants, may be installed and some large mines opened. These would be very useful in caring for new people, but a large number of small plants, many of them family enterprises, that employ much labor in relation to the amount of raw material consumed, would be as much or more effective in this regard and far more easily financed. Such enterprises would be engaged in the intensive processing and reprocessing of resources available in the Territory as distinct from the shipping out of raw materials or of semi-finished products, which is the rule at present.



"Log Rafts at an Alaska Mill"

MAR 31 1945

One of the most promising groups of small unit industries awaiting development is small woodworking plants making many items entering into house construction and turning out hundreds of wooden articles for everyday use. Alaska will consume increasing amounts of these things. The local forests should and can supply the local requirements, but at present practically all manufactured products are brought into the Territory. Export or shipment to the States of some products should also be economically possible after the War. Possibilities for these wood product enterprises might well be investigated by skilled woodworkers or groups of such workers who can command the relatively small amounts of capital needed to establish many of these industries.

The introduction of small wood-using industries in interior Alaska would require additional logging facilities. The present loggers in southeastern Alaska could supply a greatly increased demand for most classes of logs, but any increase in the demand for Alaska cedar or western red cedar would entail making special arrangements for the logging of these species.

The proposed enterprises are apart from general sawmills. Interior Alaska can in some localities support additional sawmills for the production of the common grades of construction lumber for local use. The great forests of southeastern Alaska now have sufficient sawmills to meet the lumber demands of that section, and any substantial increase in the larger types of wood-using enterprises is likely to be in the form of pulp and paper mills.

This pamphlet describes the commercial timber resources of Alaska, discusses the logging and sawmill industry, and gives examples of small wood-using industries particularly adaptable to the Territory.

TIMBER RESOURCES

Alaska's forests comprise two distinct types. One is the "Coast Forest" which is a coniferous type similar to that found immediately along the coast of Oregon, Washington, and British Columbia. In Alaska it is confined to the southeastern section and a narrow coastal belt extending northwest along 900 miles of shoreline to the mouth of Cook Inlet. The other type is the "Interior Forest" which is of the woodland type. This occupies the greater part of the large central plateau region and is confined chiefly to the bottomlands and lower slopes of the drainages of Cook Inlet and of the Yukon, Tanana, Kuskokwim, and



Copper Rivers. The coast forest has largely been included in the National Forests of Alaska, while the Interior Forest is principally on the open public domain.

Coast Forest

The Coast Forest in Alaska consists chiefly of heavy, dense stands of western hemlock and Sitka spruce. Western red cedar and Alaska cedar are frequently associated with the two principal species, and any one of the four may occasionally occur as a pure stand of small extent. In the usual mixed stand, hemlock with some cedar forms a dense main cover and this is overtopped by trees of the more light-demanding Sitka spruce occurring singly or in groups. Bushy saplings of the shade-resisting hemlock and cedars and various shrubs form a very dense understory. The commercial forest extends from the edge of tidewater to approximately 1,500 feet elevation where it gives way to stands of dwarfed, thinner trees which are designated "sub-alpine." The commercial forest which occurs largely in fairly narrow bands paralleling the shorelines is broken into large blocks by extensive non-commercial areas of scrub timber and peat muskegs. Good timber rarely extends inland more than five miles. A vast network of sheltered, navigable waterways renders a large part of the area readily accessible, and approximately 75 per cent of the useable timber lies within two and one-half miles of tidewater. The estimated stand of commercial timber is 84,750,000,000 feet board measure. The average stand per acre is about 20,000 board feet, but individual logging units vary widely from this average. Volumes of 40,000 to 50,000 board feet per acre frequently occur on small units. The average proportion of species is: western hemlock, 73 per cent; Sitka spruce, 21 per cent; western red cedar, 3 per cent; and Alaska cedar, 3 per cent.

Timber in the coast forest is sold by the U. S. Forest Service in any quantity at the following minimum stumpage prices:

Western hemlock—\$1.00 per M feet board measure.

Sitka spruce, western red cedar, and Alaska cedar—
\$1.50 per M feet board measure.

For additional information on the coastal forests, write to the Regional Forester at Juneau, Alaska, or visit any one of the Forest Service field offices, located at Ketchikan, Petersburg, Juneau, Cordova, and Seward.

Commercial Species in the Coast Forest

Western hemlock (*Tsuga heterophylla*), is the predominant

species in the coast forest. Mature trees reach diameters of from three to four feet and a height of from 100 to 140 feet. The trees are usually sound when young, but when they reach a diameter of about three and one-half feet, they become overmature and are frequently affected by disease and rapidly develop spike tops and a serious heart rot. However, about half of the trees are from 18 to 30 inches in diameter. The wood is suitable for a great variety of uses. It is moderately strong, light in weight when dry, fine grained, light in color, and almost tasteless and odorless. It is hard enough to stand up well under heavy wear, although sufficiently soft to be worked easily. It is average in nail-holding ability and tendency to split. It ranks below the cedars, but above Douglas Fir and Southern Pine in paint-holding ability. The wood has satisfactory gluing properties, but it is not durable under conditions favorable to decay. Its principal uses are pulp wood, lumber, railroad ties, and mining timbers. It is recognized as one of the standard pulping woods of the world and is used in the sulphite, sulphate, and mechanical processes. The lumber is especially good for flooring. It is also suitable for general building purposes (such as common boards and shiplap, sheeting, studding, joists, lath, millwork) and for shipping containers, cooperage, ladders, concrete forms, furniture, railroad ties, and mining timbers. Western hemlock is used extensively as piling for the construction of fish traps where long, little tapered trunks up to 120 feet in length are often needed.

Sitka spruce (*Picea sitchensis*) is Alaska's most valuable tree. In the usual mixed forest, the faster-growing and more light-demanding spruce is larger in diameter than the hemlocks and exceeds them in height. The large size and straight, clean, smooth-bark trunk makes the spruce a very impressive tree. It is commonly sound and straight-grained when young but on exposed sites is much subject to wind shake. The average mature tree is about 5 feet in diameter and 160 feet in height, but trees with a diameter of 7 feet and a height of 200 feet are not uncommon.

The wood of Sitka spruce is non-porous and has a fine even texture. It is moderately light in weight, moderately stiff, moderately soft, and has a moderately large shrinkage. It is easy to kiln dry, good in ability to stay in place, easy to work, low in nail-holding ability, easy to glue, and very low in resistance to decay. Sitka spruce is the principal saw-timber tree in Alaska and is manufactured into all the usual forms of lumber. It is an excellent specialty wood for such items as ladders and airplane

material in which its light weight and relatively high strength make it the most sought for species. Other uses include furniture, ironing boards, wash boards, clothes-drying racks, laundry tubs, baskets and hampers, tanks, boxes and crates, oars, paddles, and building construction. In addition, Sitka spruce is an outstanding pulp wood.

Western red cedar (*Thuja plicata*) occurs only in the southern half of southeastern Alaska with Frederick Sound marking its northern limit. Mature trees have an average diameter of 5 to 6 feet and a height of 100 to 125 feet. These trees have a characteristic buttressed base, heavily tapered trunk, and are subject to severe heart rot, but the trees of pole size are well formed and sound. The best trees occur as scattered individuals or in small groups in stands of hemlock and spruce. The wood is light in weight, close grained, fine textured, moderately soft, very easy to work, very low in nail-holding ability, moderate in ease of gluing, and very high in decay resistance, ranking with Alaska cedar, Port Orford cedar, redwood, and southern cypress. Its resistance to decay, ease of working, and lightness make it particularly suitable for shingles, posts, poles, and lumber which must be exposed to the weather. Cedar lumber uses include siding, tank stock, boat building, porch columns, hothouse construction, and for similar purposes where decay resistance and ease of working or lightness are especially desirable. It is also used for carving, caskets, ceiling, furniture parts, molding, patterns, picture frames, window forms and sashes, light cooperage, drafting boards, and fishing net floats.

Alaska cedar (*Chamaecyparis nootkatensis*) is found throughout the coast forest. It is closely related to Port Orford cedar which grows along the coast of northern California and southern Oregon. The best trees are found in small groups scattered through the hemlock and spruce forests. It commonly grows to a height of 75 to 100 feet with a diameter of 2 to 4 feet. Forest-grown trees are clear of branches from 35 to 60 feet. Stands yielding 15 per cent of clear lumber are considered good.

Alaska cedar combines many desirable properties, such as high durability, insect resistance, light weight, reasonable strength, low shrinkage, fine, even, straight grain, and workability not common to western woods. The heartwood is sulphur yellow, and the sapwood, which forms only a narrow band, is a dull white. The wood contains an oil which imparts a distinctive odor when freshly cut but which appears to add gloss to a newly finished surface.

Its durability, uniformly fine structure, low shrinkage factor, freedom from warping and checking, and ability to take a superior finish provide a combination of advantages which make it a superior wood for the construction of yachts, launches, small boats, canoes, and similar uses. These same qualities, together with its even, straight grain and easy working properties make it desirable for interior finish, outside trim, porch floors, doors, sash, furniture, turned articles, carving, toys, picture frames, curtain poles, fixtures, shelving, special types of flooring, cabinet work, patterns, etc. Its durability, toughness and freedom from splintering make it a favored wood for paddles, oars, posts, culvert timbers, guard rails, flume lumber, piling, marine buoys, and similar uses. It is ideal for greenhouse construction and gardening items because of its extreme durability. It is also highly suitable for the construction of clothes closets and cedar chests, because of its insect and rodent repellent quality.

It is doubtful if Alaska cedar will ever be other than a high-priced specialty wood because of the scattered nature of the stand, which entails high logging costs, and the low percentage of clear lumber obtained.

Interior Forest

Although the forests of interior Alaska are of great local value, they do not compare in commercial importance with the forests of the coastal area. They are of the woodland type and resemble the forests of northern Maine and eastern Canada both as to mixture and species. Timber growth is slow, stands are light, and the forest is often patch-like. No extended studies of the interior forest resources have ever been made, but rough estimates indicate an area of 65 to 80 million acres bear trees of such size and quality as to make them of local value for the many needs of an isolated pioneer region, including lumber, mining timbers, and homestead materials. The above mentioned area is considered to have at least 3,500 feet board measure per acre, which gives a total volume of not less than 225,000,000,000 feet board measure. The most prevalent type in the interior forest is a mixture of white spruce and Alaska white birch, with some aspen and balsam poplar. The diameter of the trees ranges from 6 to 20 inches, at breast height. A few trees reach 28 inches in diameter. The best forests occupy the better drained soils of valley floors, benches, rolling ground and the lower slopes, seldom over 800 feet above the valley floors. A non-commercial type occurs on the wet lowlands, which is predominantly black

spruce less than 6 inches in diameter with some intermixed, stunted tamarack, white spruce, and Alaska white birch.

The per capita consumption of timber in interior Alaska is high even for a frontier country. The principal uses to date have been lumber, fuel, mining timbers, and homestead materials. Very extensive timbered areas have been denuded by fire. The future local population, especially agriculturalists, will need increasingly large quantities of forest products.

Further information on the interior forests can be obtained from the Alaskan Fire Control Service, Anchorage, Alaska.

Commercial Species in the Interior Forest

White spruce (*Picea glauca*), by far the most important species of the interior, is widely distributed. Mature trees are from 50 to 75 feet in height and from 12 to 20 inches in diameter. They rarely exceed 24 inches in diameter.

The wood of white spruce is moderately light in weight, easy to kiln dry, easy to work, low in nail-holding ability, very easy to glue, very low in decay resistance, and has a large shrinkage.

White spruce has long been extensively used over the wide area it occupies in northeastern United States and eastern Canada. It has contributed greatly to the economic development of interior Alaska to date and will continue to do so in the future. The chief Alaska uses include lumber and dimension material for buildings, flumes, sluice boxes, boats, ladders, and many other general purposes.

Alaska white birch (*Betula neoalaskana*) constitutes a major portion of the vast stands of timber that are found throughout interior Alaska. It is found in mixture with white spruce on the lower benchlands and extends up the lower slopes of the foothills to an elevation of about 800 feet. Alaska white birch trees have clean, slightly tapered, cylindrical trunks. Mature trees attain a height of 60 to 70 feet. Diameters range from 10 to 14 inches with an average of 8 to 10 inches. Occasionally a tree will reach a diameter of 24 inches. Trees over 10 inches are likely to be affected by heart rot.

This birch is the most important of the few hardwood species found in the Territory. The wood is dense, has a fine, even texture, and finishes well. It is moderately heavy and moderately strong but has a very large shrinkage. It resembles paper birch quite closely in its mechanical properties. It is rated as easy to kiln dry, good in ability to stay in place, easy to work, high in

nail-holding ability, difficult to glue, and low in resistance to decay. Because of its fine, even texture, workability, and the quality of taking finishes and stains, it is very satisfactory for furniture, woodenware, novelties, and kitchenware. When stained, it resembles mahogany. It is also suitable for handles, boxes and crates, clothes pins, bungs, arrow shafts, dowels, and turned products (spools, novelties, and toys).

Aspen (*Populus tremuloides*), the most widely distributed tree species in North America, is found throughout a large part of the interior. It is small and fast growing but short lived and highly susceptible to decay. The wood is generally straight grained, and the texture is fine and uniform. It is light in weight, weak, soft and easily glued. Aspen is used in eastern United States for paper pulp, lumber (boxes and crates), excelsior and matches. It is now of no commercial importance in Alaska.

LOGGING

The present logging operations on the southern coast of Alaska are conducted primarily for hemlock and spruce but bring out some western red and Alaska cedar. If many small industries increase the demand for the cedars, additional logging units specializing in cedar production will be needed. Logging outfits getting out these two special species can be efficiently operated with as few as five men.

In southeastern Alaska the rough topography and wet ground have made machine logging with donkey engines and wire rope the most practical means of moving logs from the stump direct to tidewater or log decks. A large share of these log decks are near tidewater, but specially built motor truck and tractor roads are needed to transport the timber from the log decks to tidewater in the longer creek and river valleys. Logging throughout the year is practical in most localities as far as weather is concerned, although the short winter days are a handicap since the latitude is about the same as southern Sweden. After being placed in tidewater, logs are towed, usually as flat rafts, to the mills. The main seaways and most of the small inlets are free of ice throughout the winter, permitting water transportation at all times.

Floating logging camps which can be easily towed from one cutting area to another are used in coastal Alaska. Similarly, donkey engines and all other logging equipment are moved on scows and floats. The average cost of hemlock and spruce saw logs, exclusive of stumpage, delivered to the sawmills just prior to

the War was about \$10 per thousand board feet. The cost of logging the cedars exclusively would be much higher.

A list of loggers currently operating in southeastern Alaska can be obtained at any time from the Regional Forester at Juneau.

Logging operations in interior Alaska are more like those in northeastern United States due to the comparatively easy terrain, small trees, and light, open stands of timber. Logs can be skidded from the stump to log decks along the roads with tractors and hauled from the log decks to the mills by truck. By and large, logging in these spruce birch forests can best be confined to the winter months (November 15 to April 15) when the marshy ground and streams are frozen.

In many instances, mill operators will operate their own logging units. Logging, along with portable sawmill operations, will provide work opportunities for Alaska farmers and miners during their slack seasons if, as expected, the use of local woods increases in interior Alaska after the War. Small groups of these men in each locality can cooperate in logging and milling enterprises.

SAWMILLS

Although only twenty of the thirty-five sawmills in Alaska at present are located in the Coast Forest, they represent over 80 per cent of the cutting capacity in the Territory and cut an even higher percentage of the lumber sawed. The four largest mills in the coastal area are Ketchikan Spruce Mills at Ketchikan, Alaska ; Juneau Lumber Mills at Juneau, Alaska ; the Columbia Lumber Company mills at Sitka and Whittier, Alaska. These four mills represent over 60 per cent of the present cutting capacity in the Territory. The two largest mills, located at Ketchikan and Juneau, are modern, electric driven plants rated at 100,000 feet, board measure, per eight-hour day. Both are equipped with dry kilns, resaw plants and planing mills, and have box factories as subsidiary plants. Most of the smaller mills are equipped with planers, but they are not able to supply kiln dried resaw material. The coastal mills primarily saw western hemlock and Sitka spruce and produce practically all of the lumber used locally, including timbers for heavy construction. Only cants of high grade spruce are exported. The existing sawmills in the coastal area will likely be able to supply most of the local needs for some time.

The fifteen sawmills in interior Alaska have less than 20 per

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A detailed map of Alaska illustrating its forest zones as of 1944. The map uses three distinct patterns to represent different types of forests: solid black for Sitka spruce and hemlock along the southern coast; cross-hatching for white spruce and birch in inland areas; and diagonal hatching for sparse white spruce and birch interior forests. Major geographical features are labeled, including the Arctic Ocean to the north, Bering Strait to the west, Gulf of Alaska to the south, and North Pacific Ocean to the southeast. Key rivers such as the Yukon, Kuskokwim, and Susitna are shown. The map also indicates the international boundaries with Canada to the east and the Soviet Union to the west. A scale bar at the bottom indicates distances up to 400 miles. A key in the upper right corner explains the forest zone symbols.

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A detailed map of Alaska illustrating its forest zones as of 1944. The map uses three distinct patterns to categorize different regions: solid black for Sitka spruce and hemlock forests along the southern coast; cross-hatching for white spruce and birch forests in inland areas; and diagonal hatching for sparse white spruce and birch interior forests. Major geographical features are labeled, including the Arctic Ocean to the north, Bering Strait to the west, Gulf of Alaska to the south, and North Pacific Ocean to the southeast. Key rivers such as the Yukon, Kuskokwim, and Susitna are shown, along with major cities like Nome, Fairbanks, Anchorage, and Seward. The map also indicates the international boundaries with Canada to the east and south. A scale bar at the bottom indicates distances up to 400 miles. A key in the upper right corner provides the legend for the forest zone patterns.

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cent of the total cutting capacity of the mills in the Territory. The largest is the Independent Lumber Company at Fairbanks, with a capacity of 28,000 board feet for an eight-hour shift. The others have a capacity of less than 10,000 board feet each. Additional mills will likely be needed in the post war period to meet increased local demands.

Small portable mills that can be set up in the woods and moved readily from one location to another are most practical for use in the interior areas of light timber stands and small logs. Tractors can be used as power units for both the mill operation and the hauling of the mill from place to place. Portable mills with a rated capacity as low as from 2,000 to 6,000 feet per day, powered with tractors having 10 to 30 brake horsepower, can be used advantageously. Two men can saw and handle as much as 3,000 feet per day in such plants. Larger portable mills are available in various sizes up to capacities of 10,000 to 20,000 feet per day. Their power requirements are 40 to 75 brake horsepower. A study of local conditions must be made to determine the most economical size of mill to use.

A list of existing Alaska sawmills can be obtained at any time from the Regional Forester at Juneau.

SMALL WOOD-USING INDUSTRIES

The processing and reprocessing of wooden articles for local use will provide opportunities for the establishment of small, permanent enterprises in the Territory. Alaska has practically no industries of this type at present, and such articles must be shipped from continental United States. High cost of transportation will probably prohibit selling outside of Alaska in most cases. On the other hand, the high freight rates between continental United States and Alaska will act as a protective tariff to the Alaska industries that produce for local use in the Territory.

Examples of small wood-using enterprises that seem to provide opportunities for the establishment of new plants in this pioneer region follow:

Furniture

Wood provides most of the world's furniture. It is strong, light, warm to touch, easy to fabricate, attractive under careful smoothing and finishing, and responsive to the hand of the artist or craftsman. Alaska constitutes a good present market for locally made furniture of all types, and this should be aug-

mented in the post war years when an increased population starts building and furnishing new homes. All types of articles will be needed, including fine furniture in the form of tables, benches, chairs, desks, bookcases, buffets, sideboards, china cabinets, dressers, wardrobes and beds ; kitchen furniture, such as breakfast tables, chairs, benches, and cabinets.

Furniture of several degrees of quality will be needed. The people who are pioneering—and there may soon be large numbers of them throughout the Territory—will need inexpensive furniture. Good substantial furniture of this type can be made from western hemlock, Sitka spruce, and Alaska cedar in southeastern Alaska and from white spruce and Alaska white birch in interior Alaska. High quality furniture, for which there will also be a demand, can be made from Alaska cedar in southeastern Alaska and birch in interior Alaska. Both of these species can be readily worked and finished into beautiful furniture. Birch veneer can also be used to cover core stock made from other local woods in southeastern Alaska and interior Alaska. Beauty of grain and figure that is otherwise unobtainable can be achieved by this method. Alaska cedar and western red cedar are excellent woods for closet linings and chests used for storing clothing, since their odor is repellent to insects and rodents.

The many week-end cottages and cabins maintained by Alaskans outside the town limits along beaches, lakes and streams afford a splendid but undeveloped market for locally designed furniture for inside, veranda, and lawn use.

Woodenware and Utensils

A potential local market exists in each community for Alaska-made woodenware and utensils used in the home. Sitka spruce is well suited for bread boards, cutting boards, ironing boards, drain boards, and stepladders. Alaska cedar and Alaska white birch make good turned articles, such as table and floor lamps, candlesticks, mallets, bowls, as well as being excellent for toys and picture frames. Rolling pins, plates, trays, salt and pepper shakers, and handles for files, shovels and picks can be made of birch. Smoke stands, umbrella stands, hall trees, and stools can be made from spruce, hemlock, Alaska cedar, or birch. Red alder and wild crabapple, which are admirably suited to the manufacture of small turned articles, are also available in small quantities.

House and Cabin Logs

Logs are a favored material for houses and cabins in Alaska.

Log structures are well adapted to climatic conditions and conform with the setting. Practically all such logs are now hand-worked and a well built structure demands good craftsmanship. A ready market should be available in the larger communities for house logs of stock pattern or fashioned to order. Suppliers should be prepared to produce either hand-worked or sawn logs. For the latter, small mills could be used to face the logs on three sides, leaving the fourth side with the natural log curve.

Shingles, Shakes and Miscellaneous Red Cedar Articles

Shingles and shakes are made from western red cedar. The use of shingles, if available, for both roofs and side walls, will undoubtedly expand in the post war years when house construction and repair can be resumed on a large scale. Cedar timber suitable for the manufacture of high grade shingles and shakes occurs along the shoreline of the islands and mainland of southeastern Alaska south of Wrangell Narrows, and a manufacturer of good cedar shingles and shakes should be able to build up a good local market.

The annual consumption of cedar and composition shingles in Alaska in 1936, which is considered an average prewar year, was about 28,000 squares. Nine per cent of this quantity was of Alaska wood. Ninety-one per cent of the shingles were imported from the States, and three-fourths of the total used were of "composition" material.

Western red cedar of Alaska is reputed to be the best shingle cedar on the coast when clear, solid blocks are used, because of the narrow growth rings of the local trees. However, the average percentage of good shingle material in a log is lower than in Puget Sound trees because the forests in Alaska are at the northern limits of the range of cedar and thus the tree form is poorer and the per cent of defect is higher.

Since shakes may be hand-split as well as sawn, it would also be possible for loggers to split shakes during the winter when logging operations are closed down. Split shakes command a higher price than the sawn article. Operators might well produce other products from cedar blocks not suitable for shingles or shakes. Net floats (used to buoy seines and gill nets) can be made from small, sound, but otherwise unmerchantable cedar blocks. These blocks might be cut by a small jig or band saw into small cubes and the cube would then be rounded into a sphere or ovoid, and pierced with a hole through the longer axis, for threading on a seine rope. Great numbers of seines are used in the commercial fisheries of Alaska. Other cedar products

which could also be made from the small, clear blocks are decoy ducks, trays, dishes, boxes, and carving blocks.

Small Boats

Along sheltered waterways of Alaska the gasoline and Diesel-driven small vessel is the principal means of transportation for work and play. Over 2,000 seine and trolling boats and hundreds of pleasure craft are owned and operated in southeastern Alaska alone. In 1938 over 5,000 boats worked in the Alaska fisheries, although many of these came from Puget Sound. The great majority of these boats are of heavy construction and are less than 40 feet in length, although the many salmon cannery tenders and halibut vessels operating here average about 65 feet in length. Most all of the above mentioned boats are now built in Puget Sound plants ; so the opportunities for additional boat building in Alaska should be promising immediately after the War. Few new boats have been built since the War started, and adequate maintenance has often not been possible. Expert craftsmen would do well to study the opportunities to establish small boat shops in the several Alaska ports. Alaska cedar would be the local timber most used for planking, decking, and numerous other purposes.

The logging and hewing of Alaska cedar knees could be developed into a small specialized enterprise, since knees from this species are preferred in ship and small boat construction. Commercial tests of Alaska cedar indicate that it is equal or perhaps superior to Douglas fir and Port Orford cedar which are used in large quantities for this purpose on Puget Sound. The bulk of the knees required are 4, 5, and 6 inches in width. Countless numbers of Alaska cedar knees are obtainable in southeastern Alaska, and the business could be worked up for supplying local needs and for export trade.

Each boat, whether a fishing boat or a pleasure craft, carries one or more skiffs. Western red cedar is preferred for skiffs because of its light weight, workability, and durability. A much larger percentage of the skiffs used here could profitably be constructed locally. Competent and enterprising craftsmen could start this business with a small amount of capital.

Marine ways for the repair of small vessels are needed in each of the coastal towns. Although some of the towns already have marine ways for small boats, others are without such enterprises.

Oars and Paddles

Since the most prevalent means of transportation in southeastern Alaska is by small boat, a great many oars are necessarily used. A small oar factory is operated near Ketchikan by a man and his wife. The plant produces a superior Sitka spruce oar, and has been unable to supply the local demand, while large orders from Pacific Northwest dealers have had to be refused. More oar plants should be established in southeastern Alaska by enterprising and skilled woodworkers. In addition to the local market, an export trade to Puget Sound should be possible. The factory should preferably be situated near an existing saw-mill, where good, clear stock is obtainable.

Pike poles, broom handles, gaff hook handles, and similar turned articles could also be produced from spruce by oar manufacturing plants.

Fish Containers

Mild-cured salmon and pickled herring are packed in barrels or tierces which are now largely manufactured outside of the Territory. In 1939 approximately 5,900,000 pounds of mild-cured salmon, requiring 7,400 barrels, and about 2,900,000 pounds of pickled herring, requiring 3,600 barrels, were produced.

Sitka spruce and western hemlock are considered satisfactory wood for fish barrels. Plants for the manufacture of fish barrels should be installed near sawmills to permit more economy in the selection and use of their raw material.

Large boxes weighing approximately 400 pounds when filled are used in shipping fresh and frozen salmon and halibut. Over a half million of these boxes were used in 1939. A considerable amount of this box material is manufactured at the Juneau and Ketchikan mills, but the entire supply could be produced in the Territory. Both western hemlock and Sitka spruce are satisfactory for fish boxes.

Novelties

Novelty manufacturers were needed in Alaska before the War—men and women who could make inexpensive and attractive miscellaneous articles symbolic of Alaska for sale to tourists and, to a lesser extent, to the local residents. Novelty and curio shops are now operated in all of the principal towns and naturally this business will be extended to airport stations, lodges,

and dude ranches to be established at strategic points after the War.

Novelty and curio dealers purchase articles from the Eskimos and Indians along the Arctic Ocean and Bering Sea and in southeastern Alaska. The Eskimo curios consist largely of carved and polished ivory items. Reed and grass woven baskets come from the Aleuts, and wood totem poles and spruce root baskets from the southeastern Alaska Indians. The supply of novelties and these native curios has been insufficient to meet the demand. Large quantities of the cheaper novelty items were obtained outside the Territory in prewar days. The elimination of Japan as a source of novelty supply and the expected tourist increase to Alaska will improve the field for novelty manufacturers here at the close of the War. Attractive and distinctive novelties from native woods would include ash trays, book ends, guest book covers, trays, plates, spoons, paper weights, tie racks, carved figures of animals and birds, and many other objects. Popular animals to carve are bear, reindeer, mountain sheep, fox, walrus, seal, and sled dogs. Birds include eagles, ducks, ptarmigan, seagulls, ravens, geese, and swans.

Novelty plants should be established near sawmills from which the inexpensive raw stock they need can be obtained from planer ends and mill waste. The suitable woods of southeastern Alaska are Sitka spruce, western red cedar, and Alaska cedar. Birch is the outstanding species of interior Alaska for this purpose, but white spruce is also acceptable for numerous items.

The manufacture of wooden toys for sale in Alaska is a closely related industry that could be operated in conjunction with novelty manufacture. Such plants would also furnish blanks of Alaska cedar and birch for the use of wood carvers, including blanks for native Indian totem pole carvers, and for makers of carved toys.

Railroad Ties

The Alaska Railroad is expected to use approximately 120,000 to 150,000 ties annually for some time in the post war years. Before the War approximately one-half of the ties used were cut in Alaska, and the remainder were obtained from the Pacific Northwest. This means there is a potential market in Alaska for an additional 60,000 to 75,000 locally-produced hemlock ties. The new, fairly large sawmill at Whittier will no doubt furnish some of these. But ties can be produced in very simple, small mills. Men in the seasonal industries, such as mining, fishing, and agriculture have, therefore, an opportunity to form a group

for the production of ties and rough side-cut lumber during the winter months when they would otherwise be unemployed. Such operations can be conducted most advantageously in the hemlock forests along the coast from Cordova to Seward in the vicinity of the railroad terminal. If facilities were provided for the preservative treatment of timber by the railroad or by some private agency, ties and piling of white spruce could be produced from stands along the railroad right-of-way.

Float Logs, Piling, and Mining Timbers

The cutting and marketing of float logs for salmon traps, piling for wharves and traps, and of mining timbers was sufficiently developed before the War to meet most of the local needs. Piling production has excellent possibilities for post war expansion if a timber preservative plant is installed in Alaska for the treatment of piling to be used in marine structures.

Wood Preservation Plants

Wood preservation plants represent a larger investment than minor wood-using industries. It seems advisable, however, to include some information on the potential market for treated material in Alaska in view of the need for a treatment plant here. The greatest potential users are salmon cannery corporations, mining companies, towns, government agencies using material on construction jobs, and public agencies that maintain waterfront structures. The estimated possible annual demand for treated material for the first four or five years following the close of the War is as follows: (1) The coastal section of Alaska as far west as Kodiak Island, 290,000 linear feet of piling and 2,800,000 board feet of lumber. This represents about one year of work for one 7' by 130' retort using creosote. The piling is used principally for wharves, wharf approaches, foundations for fish canneries, warehouses, and other industrial buildings on the waterfront, for small boat harbors, dolphins, bridges, and trestles. The treated lumber is used principally for the superstructure of wharves and for the substructures of the above mentioned waterfront structures, for bridges and culverts, and for mining timber and capping. (2) Interior Alaska, 8,000,000 board feet representing approximately 210 days of work for a 7' by 130' retort using creosote. The output would consist chiefly of railroad ties, bridge and trestle timbers and decking, culverts, and mining timbers. Potential large users are the Alaska Railroad, the road building agencies, and mining companies.

The first initial plant should probably be installed at either:

(1) Whittier or Anchorage, or (2) some point in southeastern Alaska. The more northerly plant would be located on the railroad and would have access to a supply of sawn material from the new Columbia Lumber Company sawmill at Whittier, or from the more distant mills in southeastern Alaska which would be shipping into the railroad belt. A plant in southeastern Alaska could be located adjacent to a sawmill as a source of material to treat, and, after processing, the product could be distributed throughout southeastern Alaska, and by commercial steamer to the other sections of coastal Alaska and to the Whittier-Anchorage region. The material treated would consist chiefly of western hemlock, which takes treatment fairly well.

Poles

An unprecedented demand in the United States for power line poles after the War will accentuate a shortage that already exists. Normally, three and one-half million poles are needed annually for maintenance and extension of telephone, telegraph, and power lines. A tremendous impetus is expected in the building of power lines, since plans have already been developed for the extension of electrification to over five million new rural customers. Prospective orders late in 1944 from one source in four northwestern States called for 53,000 poles.

Because of its extreme durability in contact with the soil, western red cedar is one of the premier species for poles. Readily accessible, pole-sized cedar has almost reached the vanishing point in the Pacific Northwest which was heretofore the chief source of supply. An increasing proportion of the cedar pole stock will, therefore, have to be drawn from other sources—British Columbia and possibly southeastern Alaska. This great demand for poles will likely make it profitable to export them from the vicinity of Ketchikan. Shipment could be made through nearby Prince Rupert, British Columbia, or through Seattle.

Alaska could produce long heavy transmission line poles. Southeastern Alaska affords a market for some transmission poles. A local demand also exists for small spruce poles up to 40 feet in length, for trolling poles on fish boats, and for spruce masts on small ships.

Alaska cedar is exceptionally good pole material, but is not likely to be used for this purpose to any great extent because of its higher logging cost due to scattered occurrence in the forest.

Birch Veneer

Veneer panels have beauties of grain and figure that are un-

obtainable from solid wood. Configuration and patterns, such as are found in crotches of birch trees where a limb branches from the trunk, are particularly valuable for use as surface veneer and are usually cut in thicknesses of 1/20 to 1/32 of an inch.

There will be a local market for sliced or sawn Alaska white birch veneer when furniture manufacturing plants are established in Alaska. The export of birch veneer to furniture plants in Oregon and Washington is considered feasible since birch supplies in the Pacific Northwest are very meager. Although Alaska white birch has been considered somewhat difficult to glue, it has the other necessary property needed for fine veneer—ability to take a finish, ability to stay in place, ease of working, and resistance to shock or toughness. Slicing or sawing rather than the rotary process are considered most adaptable for birch, since the larger trees are inclined to have center rot that makes it difficult to hold the logs in a lathe. The initial cost of a veneer plant is higher than for most of the other opportunities for wood industries covered in this section.

CONCLUSION

Three-fourths of Alaska is in the north temperate zone. The climate in southeastern Alaska is similar to that along the Washington and British Columbia coast, although the average temperature is slightly lower. Interior Alaska's climate is characterized by long cold winters, warm summers, and light precipitation. Alaska's prewar population was 72,500. The present population of Ketchikan, Juneau, Fairbanks, and Anchorage varies from about 5,000 to 10,000. Although the towns are small, they have modern schools, hospitals, churches, hotels, theatres, stores, electric power (hydroelectric power along the coast), and other facilities expected in up-to-date communities.

Opportunities definitely exist in Alaska for the installation of small wood product industries primarily for local consumption. The type of industry initiated depends upon the skill, resources, and desires of the individual. The best policy is to start in a modest capacity and increase the scope and volume of production after the plant is in successful operation and markets are developed. In any event, an individual should have or develop a good understanding of production and marketing for the item selected before investing funds in an enterprise. *Anyone interested in establishing wood using industries should come to Alaska and personally investigate the possibilities.*